

SATELLITE ALTIMETER MEASUREMENTS OF SURFACE WIND

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ABSTRACT.

Recent analyses of wind speed measurements by the Geosat altimeter showed that the radar cross section is affected by oceanographic factors, particularly by the degree of sea development, which are not directly accounted for in the geophysical model functions (GMF). In the present work, two new GMFs which account for the effects of the actual degree of sea development are proposed. Along with the radar cross section, these models use the significant wave height (SWH) information. One particular version is recommended for applications in oceanographic and climate studies where wind speed (or wind stress) data have to be binned (i.e., averaged over time and/or space intervals). The accuracy of this GMF (the overall bias 0.1 m/s and the rms error about 1.6 m/s) is higher than the accuracy of commonly employed GMFs while the wave-age-related trend is reduced to a geophysically insignificant level. Finally, the wind speed histograms for the collocated data set are derived and compared with the ground truth data as well as with the histograms yielded by presently known GMFs. It is also shown that the accuracy of altimeter measurements could be increased even further if some additional information on the wave field were available from independent sources (e. g., the dominant wavelength from SAR images).

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